

NON-PUBLIC?: N
ACCESSION #: 9503280194
LICENSEE EVENT REPORT (LER)

FACILITY NAME: St. Lucie Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000389

TITLE: Automatic Reactor Trip on Low Steam Generator Water Level
due to a Failed Level Transmitter
EVENT DATE: 02/21/95 LER #: 95-002-00 REPORT DATE: 03/21/95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Jack Breen, Shift Technical TELEPHONE: (407) 465-3550
Advisor

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: SJ COMPONENT: LT MANUFACTURER: X999
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On February 21, 1995, at 1317 hours, St. Lucie Unit 2 automatically tripped from 100%, power, due to low water level in the 2A Steam Generator. In accordance with Emergency Operating Procedure (EOP)-1, Standard Post Trip Actions were performed. When all safety function status checks were satisfactorily completed, the operating staff exited EOP-1 and entered EOP-2, "Reactor Trip Recovery". Normal Steam Generator water levels were regained and the Unit was stabilized in Mode 3.

The event was initiated when level transmitter LT-9011 failed high. The most likely root cause of the level transmitter failure was determined, by the vendor, to be due to coalescing of microscopic conductive particulates in the fill fluid which acts as a short circuit between the center diaphragm of the transmitter and one of the sensor cell capacitor plates.

Corrective Actions for this event include: 1) Verification that no other components failed in the Feedwater Control System. 2) A bench test on LT-9011 to confirm the level transmitter had failed. 3) A new level transmitter for LT-9011 was placed in service. 4) The failed transmitter was sent to the manufacturer for a detailed failure analysis. 5) Engineering is evaluating the failure analysis, to determine the appropriate actions to prevent reoccurrence of this event and its impact on other plant transmitters.

END OF ABSTRACT

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DESCRIPTION OF THE EVENT

On February 21, 1995, at 1317 hours with St. Lucie Unit 2 in Mode 1 at 100% power, the reactor automatically tripped due to valid low water level in the 2A Steam Generator(SG). Just prior to the reactor trip, a Reactor Operator (RCO) witnessed the alarming of annunciator G1, "2A S/G LEVEL HI/LO" (EIIS:IB). Upon acknowledgement of the annunciator, the RCO observed SG level indications. He looked at both wide range and narrow range SG level indications. The wide range level indication indicated that level in the 2A SG was rapidly decreasing, in contrast the narrow range SG level indication indicated that the 2A SG level was at 100%. The RCO then observed the four narrow range safety channels: The narrow range safety channels indicated that level in the 2A SG was rapidly decreasing. The RCO promptly switched the feedwater indicator controller from automatic to manual, in an attempt to regain SG water level. At that time, the Assistant Nuclear Plant Supervisor directed the RCO to trip the reactor. However, before that action could be completed the reactor tripped automatically due to valid low water level in the 2A SG.

All plant safety functions were met. The Auxiliary Feedwater Actuation System (AFAS)(EIIS:BA) functioned as required during this event. Additional observations, were the lifting of the suction relief valve of the 2A Main Feedwater Pump (MFP)(EIIS:SJ), followed by the tripping of the 2A MFP due to a low flow condition. This was a result of the closure of the MFRV. The lifting of the 5B High Pressure Feedwater Heater (HPFH)(EIIS:SN) safety relief valve and several Main Steam Safety Valves (MSSV)(EIIS:SB) were also observed, due to the increase in pressure of the secondary system following the MFRV closure. The 5B HPFH safety valve and the MSSV's reseated and the plant was stabilized in Mode 3, Hot standby.

CAUSE OF THE EVENT

The event was initiated when level transmitter LT-9011 failed high. This transmitter sends an input signal to the Feedwater Control System, which then sends an output signal to FCV-9011, the MFRV, level recorder 9011 and FIC-9011. When the transmitter failed high, indicating 100% level in the 2A SG, it sent a signal to close the MFRV. When the MFRV went closed, all feedwater to the 2A SG was stopped. The level in the 2A SG started decreasing rapidly. When the level in the 2A SG reached 56%, annunciator G1, "2A S/G HI/LO", alarmed. Annunciator G1 receives its signal from level transmitter 9005 (LT-9005). Similar to LT-9011, LT-9005 is also a narrow range level transmitter. By the time annunciator G1 had alarmed, water level in the 2A SG was already decreasing rapidly. The reactor tripped automatically, as required, at 20.5% SG level.

The most likely root cause of the level transmitter failure was determined, by the vendor, to be due to coalescing of microscopic conductive particulates in the fill fluid which acts as a short circuit between the center diaphragm of the transmitter and one of the sensor cell capacitor plates. A review of St. Lucie maintenance history did not indicate any previous similar failures of this type of level transmitter.

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ANALYSIS OF THE EVENT

This event is reportable under 10 CFR 50.73 a.2.iv. as, "any event or condition that resulted in manual or automatic actuation of any engineered safety feature, including the Reactor Protection System.

The plant response to this event was bounded by the accident analysis of the St. Lucie Unit 2 Final Safety Analysis Report (FSAR), section 15.2, "Decreased Heat Removal by the Secondary System". The actual plant response was more conservative because of the following:

- 1) Only one Feedwater Regulating Valve closed in this event, instead of a total loss of normal feedwater.
- 2) The reactor automatically tripped due to low 2A SG water level. In the accident analysis, the reactor is assumed to trip on high pressurizer pressure. During the transient primary pressure never exceeded 2300 psia, therefore the high pressurizer pressure trip setpoint of 2370 psia was never challenged.

All plant safety functions were met. The Auxiliary Feedwater Actuation System functioned as required during this event. Therefore, the health and safety of the public were not affected by this event.

CORRECTIVE ACTIONS

- 1) System verification showed no other components failed in the Feedwater Control System.
- 2) LT-9011 was bench tested and confirmed to have failed high.
- 3) A new level transmitter was placed in service for LT-9011.
- 4) The corresponding level transmitter for the 2B SG (LT-9021) was replaced.
- 5) The failed level transmitter was sent to the manufacturer for a detailed failure analysis.
- 6) Engineering is evaluating the failure analysis, to determine the appropriate actions to prevent reoccurrence of this event and its impact on other plant transmitters.
- 7) Engineering will evaluate the feasibility of design modifications, to minimize or eliminate plant trip single point vulnerabilities in the Feedwater Control System.
- 8) Training will evaluate this event for use in Licensed Operator Requalification training.

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ADDITIONAL INFORMATION

Failed Components Identified

Rosemount Differential Pressure Transmitter, Model #1152DP5E92PB

Previous Similar Events

LER 335-91-05, "Reactor Trip from 100% Power on Low Steam Generator Water Level caused by a De-energized Feedwater Regulating Valve due to a Deficient Procedure."

LER 335-88-08, "Reactor Trip on Low Steam Generator Level Due to Inadvertent Closure of a Main Feedwater Regulating Valve."

LER 335-88-03, "Reactor Trip on Low Steam Generator Level Due to Main Feed Regulating Valve Equipment Failure."

ATTACHMENT TO 9503280194 PAGE 1 OF 1

Florida Power & Light Company,
P.O. Box 128, Fort Pierce, FL 34954-0128

March 21, 1995

FPL

L-95-093
10 CFR 50.73

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: St. Lucie Unit 2
Docket No. 50-389
Reportable Event: 95-002
Date of Event: February 21, 1995
Automatic Reactor Trip on Low Steam Generator
Water Level Due to a Failed Level Transmitter

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,

D. A. Sager
Vice President
St. Lucie Plant

DAS/EJB

Attachment

cc: Stewart D. Ebnetter, Regional Administrator, USNRC Region II
Senior Resident Inspector, USNRC, St. Lucie Plant

an FPL Group company

*** END OF DOCUMENT ***
